

Chemical Control/New Products

NEW INSECTICIDES FOR PEAR PSYLLA (HOMOPTERA: PSYLLIDAE) AND CODLING MOTH (LEPIDOPTERA: TORTRICIDAE) CONTROL

H. Riedl, D. Devore, S. Emmons, J. Farnsworth, G. McCarty, M. Omeg, and J. Snelling  
Mid-Columbia Agricultural Research and Extension Center, Oregon State University,  
Hood River, OR

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**Pre-bloom pear psylla control.** The pre- as well as post-bloom pear psylla control programs have undergone major changes in recent years thanks to a number of new registrations. Since 1994, growers in the Mid-Columbia fruit-growing district have relied primarily on insect growth regulators (IGRs) for pre-bloom pear psylla control: Comply (fenoxycarb) from 1994 to 1997 and Esteem (pyriproxyfen) since then. However, Esteem has been less effective than Comply and growers have again begun to use some of the old pre-bloom insecticides such as Asana (esfenvalerate) and Thiodan (endosulfan) for control of overwintering pear psylla adults. There are still questions about the best use and timing of Esteem for early season pear psylla control. During two years of field trials at the Mid-Columbia Experiment Station, Esteem at pink and petal fall provided better control than earlier timings around delayed dormant. If Asana or Thiodan were applied against overwintering adults at delayed dormant followed by Esteem around bloom time, control was generally improved and extended into early July.

Pyramite (pyridaben) is a promising insecticide for pear psylla control just before bloom. In addition to pear psylla, Pyramite suppresses other pear pests including pear rust mite and spider mites. Its pest spectrum is similar to Morestan's which in the past was used at this timing but is no longer available. In a demonstration trial at the Mid-Columbia Experiment Station, Pyramite applied at pink (April 14) to a 2.2 acre Anjou pear block provided control of pear psylla through April and May. From then on natural enemies, primarily predatory plant bugs, lacewing larvae and earwigs, built up sufficiently to maintain pear psylla below damaging levels for the rest of the season. No additional pear psylla sprays had to be applied in this block and fruit at harvest was free of russet damage from pear psylla honeydew.

Another potential insecticide for pre-bloom pear psylla control is Surround, a kaolin clay product. Surround produces a white coating which discourages pear psylla from laying eggs, similar to horticultural mineral oil. Although Surround has been shown to be quite effective for pre-bloom pear psylla control, it has no effect on some of the other pests (e.g., San Jose scale) which need to be controlled at that time of year. Surround has not been evaluated in the Hood River district.

**Post-bloom pear psylla control.** The pre-bloom control programs growers are currently using can be expected to provide pear psylla control through May and into mid to late June. Hopefully, with renewed attention to adult pear psylla control in the pre-bloom period, the time when pear psylla begins to build up and exceed economic thresholds can be extended even longer. Should pear psylla control become necessary during the summer, and it usually does, growers have many more insecticides to choose from than they had just a few years ago. Until the mid-1990s, the insecticide choices for pear psylla control for the foliar period (bloom to harvest) were quite limited. Mitac (amitraz), insecticidal soap, and spray oils were the only insecticides available until Agri-Mek (abamectin) became available under an emergency exemption in 1988. Because of a broader pest spectrum and perception of better activity against pear psylla, Agri-Mek became the preferred control option for most growers. Mitac use declined even further between 1994 and 1998 when Comply reduced the need for pear psylla control during the summer. So far there are no indications of resistance development to either Mitac or Agri-Mek in the Hood River district.

There are a number of new registrations for foliar pear psylla insecticides. Provado (imidacloprid), a neonicotinyl insecticide, was registered in 1996, Pyramite in 1997, the hydrophilic clay product Surround in 1998, and the IGR Esteem in 1999. When these products came on the market there was little information on how to use them for pear psylla control. During the last two years field and laboratory studies were conducted at the Mid-Columbia Experiment Station to compare the effectiveness of Provado, Pyramite, Agri-Mek, Esteem and Mitac against pear psylla eggs, nymphs and adults in order to determine the best fit in a seasonal control program and assess their impact against natural enemies.

In laboratory studies, pear psylla adults were caged on pear leaves for 48 hours to obtain freshly laid eggs on leaf tissue. Leaves with eggs were sprayed with field rates of Mitac, Agri-Mek, Provado, Pyramite and Esteem using a hand sprayer. In these tests Esteem and Pyramite were more effective against pear psylla eggs than any of the other insecticides. Provado and Mitac had low activity against eggs. However, Agri-Mek caused no egg mortality. With the exception of Esteem, all insecticides in the tests controlled first instar nymphs. There are also major differences in terms of adulticidal activity among the newer insecticides. This was demonstrated in a replicated handgun trial on Anjou pears with a very high pear psylla population. Mitac, Provado and Pyramite were compared in terms of impact on different pear psylla life stages. Only Provado and Mitac caused an immediate reduction in the adult pear psylla population while Pyramite had no effect on adults. Mitac, Provado and Pyramite caused mortality primarily among the younger nymphs. A few nymphs made it to the hardshell stage in the Pyramite treatment, suggesting that Pyramite may not have the persistence of the other materials. Horticultural mineral oil when added to the spray mix at 0.25 or 0.5% improved the performance of Provado for pear psylla control. However, applying Pyramite with oil did not improve pear psylla control over Pyramite alone.

**Codling Moth.** There are several new insecticides with codling moth activity which may have potential uses as supplemental controls in conjunction with mating disruption. However, they are generally weaker materials and will not provide the same level of control as organophosphates (OP) if used alone. The following materials have shown promise as OP replacements for codling moth control in field and laboratory trials conducted over the last few

years at the Mid-Columbia Experiment Station: the ecdysone agonists Confirm (tebufenozide) and Intrepid (methoxyfenozide); the juvenile hormone mimic Esteem (pyriproxyfen); Success (spinosad); Avaunt (indoxacarb) and the neonicotinyl insecticide Calypso (thiacloprid). In field tests, Agri-Mek has shown enough codling moth activity to serve as a substitute for OPs in early cover sprays. Results of laboratory tests on the susceptibility of different codling moth life stages to some of these newer insecticides will be presented.